

Session 4

FOUR FOURS CHALLENGE

The class is challenged to make as many numbers as they can using AT MOST four fours and any mathematical sign. For example $4 \times 4 + 4 + 4 = 24$, $4 - 4 + 4 - 4 = 0$, $44 + 4/4 = 45$, $4 + 4 = 8$. The teacher will need to negotiate with the class what signs are allowed (e.g. brackets, +, x, -, ÷, etc.). This activity may extend over several days or weeks, as students gradually build up a wall chart showing how to do many numbers (e.g. all up to 100 and some beyond). Students can add contributions daily, to be checked or challenged by classmates. Alternative solutions can also be recorded.

1. Introduce the problem and illustrate with a simple case, such as $4 + 4 + 4 + 4 = 16$. Ask for other suggestions from the class and record these in words (if necessary) and symbols.
2. Challenge the class to see which of the numbers from 1 to 100 they can make. Divide the class into groups to let students make a start on the problem. Make sure the groups record their answers in words as well as symbols when necessary.
3. Some suggestions will need brackets inside brackets. This may need to be discussed with the class.
4. Many interesting questions will arise that will extend students' knowledge of numbers and operations. For example, students who write $4 - 4 - 4 + 4$ may wonder whether this is equal to zero (it is) because they need to go into negative numbers to work it out.
5. Add selected solutions to the wall chart.
6. Finish the session with a progress report from the groups and set them the challenge of seeing how many other numbers can be done.

Session 5

Conduct this session when good progress has been made on completing the four fours chart, e.g. when most of the numbers from 1 to 100 have been completed. Select examples from the chart to illustrate the following points:

1. The order of operations matters e.g. working out $4 \times 4 - 4 \div 4$ you can get many answer

$$((4 \times 4) - 4) \div 4 = 3$$

$$4 \times 4 - 4 \div 4 = 15$$

$$4 \times (4 - 4 \div 4) = 12$$

$$4 \times (4 - 4) \div 4 = 0$$

People need to be able to communicate exactly what calculations they intend to be done. This is done by agreed rules (conventions) and by using brackets.

2. Discuss and clarify the use of brackets and conventions as necessary. Promote the use of brackets wherever ambiguity may arise.